REMARKS

This Amendment is being submitted on May 2nd, which is a two month timely response to the Official Action issued on March 1st because May 1st falls on a Sunday.

The Amendment does not contain any new matter and further clarifies what we thought was the clear distinction between the present invention and the prior art. In view of a further telephone interview with the Examiner John Lee, as detailed below, claim 11 has been amended and it is believed that all pending claims are now allowable.

The Examiner has refused to be persuaded by the arguments submitted to him 17 February 2005 to allow pending Claims 11-13 under 35 U.S.C 102(e) in view of Whitehouse et al., U.S. Patent No. 5,962,851.

Regarding Claims 11, 12, and 13, the Examiner now states:

> "Applicant's arguments filed on 17 February 2005 have been fully considered but they are not persuasive. ... Applicant argued that Whitehouse et al. (5,962,851) does not disclose a two-dimensional multipole ion guide that functions as a two-dimensional ion trap as recited in part c) of claim 11. ... This argument is not persuasive. Since, Whitehouse et al. (5,962,851) disclose a two-dimensional multipole ion guide that functions as a two-dimensional ion trap (see col. 3, lines 51-57; col. 5, line 67 to col 6, line 4; col. 10, lines 17-20; and col. 19, lines 34-37."

Response:

Claim 11 as newly amended:

11. (Fourth Amendment) An apparatus for analyzing chemical species comprising:

(a) a time-of-flight mass analyzer with an ion pulsing region and a detector,

(b) an ion source for producing ions forming an ion beam from said chemical species,

(c) a two-dimensional multipole ion guide <u>having an ion guide axis of symmetry and</u> having an entrance end where ions enter said ion guide from said ion source and an exit end where ions exit said ion guide, said two-dimensional multipole ion guide

functioning as a two-dimensional ion trap, wherein said two-dimensional multipole ion guide comprises a plurality of spaced apart rods parallel to each other and extending from said entrance end to said exit end, said ion beam having an axis thereof which is parallel to said spaced apart rods, said two dimensional ion trap trapping ions in all axes including the axis which is generally parallel to the ion guide axis of symmetry,

(d) means for pulsing said ions, transferred into said pulsing region, into said time-of-flight mass analyzer for mass analysis, and

(e) means for detecting said mass analyzed ions.

Element (c) of pending Amended Claim 11 includes the limitation: "...said two-dimensional multipole ion guide functioning as a two-dimensional ion trap,...".

The Examiner states that: "... Whitehouse et al. (5,962,851) disclose a two-dimensional multipole ion guide that functions as a two-dimensional ion trap (see col. 3, lines 51-57; col. 5, line 67 to col 6, line 4; col. 10, lines 17-20; and col. 19, lines 34-37."

Col. 3, lines 51-57 reads:

> "If an ion with a given mass to charge ratio falls within the operating stability region set for a multipole ion guide, the ion will be effectively trapped from drifting to far in the off axis direction but is free to move in the direction of ion guide axis. If the ion m/z falls outside the stability region, it will not have a stable trajectory and will be rejected from the ion guide before it reaches the exit end."

Col. 5, line 67 to col 6, line 4 reads:

> "The AC field of the multipole ion guide traps ions within a radial cross section and prevents scattering losses of the ions undergoing collisions with the background gas as the ions traverse the ion guide length."

Col. 10, lines 17-20 reads:

> "The offset potential should not effect the stability of the ion trajectories once the ions pass into the ion guide and are trapped within the rods other than to influence their initial entrance trajectory."

Col. 19, lines 34-37 reads:

> "A large portion of ions exiting the capillary enter the multipole ion guide 165 and are effectively trapped and efficiently transported through its entire length."

As in the office action response of 17 February 2005, we maintain that Whitehouse ('851) falls to teach, mention or suggest a two-dimensional multipole ion guide that functions as a two-dimensional ion trap as is understood in the art.

It is well-known to those skilled in the art that the basic function of a two-dimensional multipole ion guide, that is, to guide ions along a particular direction, is achieved by preventing the ions from leaving the ion guide in radial directions, that is, in any direction orthogonal to the ion guide axis of symmetry, but not parallel to its axis of symmetry, that is in the longitudinal direction. That is, ions are free to move longitudinally, that is, in directions parallel to the ion guide axis of symmetry in a two-dimensional ion guide. Hence, a two-dimensional ion guide functions fundamentally to guide ions by essentially 'trapping' ions in any direction orthogonal to the ion guide axis of symmetry, that is, in any radial direction, but does not 'trap' ions in the longitudinal directions parallel to the ion guide axis of symmetry, thereby defining a direction in which the ions are 'guided' along. In other words, ions are described as being "trapped" in radial directions, but not in the longitudinal directions, in a two-dimensional ion guide. This is made explicit in the first passage from the '851 patent quoted above, col. 3, lines 51-57. Thus, a two-dimensional ion guide that guides the flow of ions along a particular direction functions much like a pipe that is used to guide fluid from one place to another along a particular direction. The pipe 'traps' the fluid from flowing in any direction but along the axis of the pipe.

Now, it is well known in the art that a "two-dimensional ion trap" refers to a two-dimensional ion guide which functions to trap ions not only in radial directions, as in normal ion guide operation, but also to trap ions in the longitudinal direction, that is, along the ion guide axis. Hence, as is well known in the art, a two-dimensional ion guide functions as a two-dimensional ion trap when it is configured and operated to trap ions in both radial as well as longitudinal directions.

In each of the above passages, as well as anywhere else in the '851 patent, the references to trapping ions in the ion guide refer universally to trapping the ions in the ion guide in the radial directions only, which is inherent to the normal operation of a two-dimensional ion guide to guide ions freely along the ion guide axis of symmetry, as is well known in the art. There is no suggestion, mention or teaching in the '851 patent of an ion guide that functions as a two-dimensional ion trap, that is, in which ions are trapped in an ion guide in both radial as well as longitudinal directions.

In a telephone interview with Examiner John Lee, he pointed out that "two dimensions" could be interpreted as the x-y axis of the radical direction. He agreed that the prior art Whitehouse '851 reference did not teach trapping in the z or longitudinal direction. Thus, to eliminate any doubt on this, claim 11 has been further amended to specifically recite trapping in the longitudinal as well as the radial directions.

In view of the interview and the further amendment to claim 11, claims 11, 12 and 13, are believed allowable for the reasons stated above and an early notice of allowance is earnestly requested.

Respectfully submitted,

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